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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/977,048	10/12/2001	Stephen Clarke	S1022/8767	1792

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WOLF GREENFIELD & SACKS, PC
FEDERAL RESERVE PLAZA
600 ATLANTIC AVENUE
BOSTON, MA 02210-2211

EXAMINER	
KENDALL, CHUCK O	

ART UNIT	PAPER NUMBER
2192	

DATE MAILED: 11/28/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Advisory Action Before the Filing of an Appeal Brief	Application No. 09/977,048	Applicant(s) CLARKE, STEPHEN	
	Examiner Chuck O. Kendall	Art Unit 2192	

--The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

THE REPLY FILED 21 September 2005 FAILS TO PLACE THIS APPLICATION IN CONDITION FOR ALLOWANCE.

1. ☒ The reply was filed after a final rejection, but prior to or on the same day as filing a Notice of Appeal. To avoid abandonment of this application, applicant must timely file one of the following replies: (1) an amendment, affidavit, or other evidence, which places the application in condition for allowance; (2) a Notice of Appeal (with appeal fee) in compliance with 37 CFR 41.31; or (3) a Request for Continued Examination (RCE) in compliance with 37 CFR 1.114. The reply must be filed within one of the following time periods:
   a) ☒ The period for reply expires 3 months from the mailing date of the final rejection.
   b) ☐ The period for reply expires on: (1) the mailing date of this Advisory Action, or (2) the date set forth in the final rejection, whichever is later. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of the final rejection.

   Examiner Note: If box 1 is checked, check either box (a) or (b). ONLY CHECK BOX (b) WHEN THE FIRST REPLY WAS FILED WITHIN TWO MONTHS OF THE FINAL REJECTION. See MPEP 706.07(f).

Extensions of time may be obtained under 37 CFR 1.136(a). The date on which the petition under 37 CFR 1.136(a) and the appropriate extension fee have been filed is the date for purposes of determining the period of extension and the corresponding amount of the fee. The appropriate extension fee under 37 CFR 1.17(a) is calculated from: (1) the expiration date of the shortened statutory period for reply originally set in the final Office action; or (2) as set forth in (b) above, if checked. Any reply received by the Office later than three months after the mailing date of the final rejection, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

NOTICE OF APPEAL

2. ☐ The Notice of Appeal was filed on _____. A brief in compliance with 37 CFR 41.37 must be filed within two months of the date of filing the Notice of Appeal (37 CFR 41.37(a)), or any extension thereof (37 CFR 41.37(e)), to avoid dismissal of the appeal. Since a Notice of Appeal has been filed, any reply must be filed within the time period set forth in 37 CFR 41.37(a).

AMENDMENTS

3. ☐ The proposed amendment(s) filed after a final rejection, but prior to the date of filing a brief, will not be entered because
   (a) ☐ They raise new issues that would require further consideration and/or search (see NOTE below);
   (b) ☐ They raise the issue of new matter (see NOTE below);
   (c) ☐ They are not deemed to place the application in better form for appeal by materially reducing or simplifying the issues for appeal; and/or
   (d) ☐ They present additional claims without canceling a corresponding number of finally rejected claims.

   NOTE: _____. (See 37 CFR 1.116 and 41.33(a)).
4. ☐ The amendments are not in compliance with 37 CFR 1.121. See attached Notice of Non-Compliant Amendment (PTOL-324).
5. ☐ Applicant's reply has overcome the following rejection(s): _____.
6. ☐ Newly proposed or amended claim(s) _____ would be allowable if submitted in a separate, timely filed amendment canceling the non-allowable claim(s).
7. ☐ For purposes of appeal, the proposed amendment(s): a) ☐ will not be entered, or b) ☐ will be entered and an explanation of how the new or amended claims would be rejected is provided below or appended.

   The status of the claim(s) is (or will be) as follows:
   Claim(s) allowed: _____.
   Claim(s) objected to: _____.
   Claim(s) rejected: _____.
   Claim(s) withdrawn from consideration: _____.

AFFIDAVIT OR OTHER EVIDENCE

8. ☐ The affidavit or other evidence filed after a final action, but before or on the date of filing a Notice of Appeal will not be entered because applicant failed to provide a showing of good and sufficient reasons why the affidavit or other evidence is necessary and was not earlier presented. See 37 CFR 1.116(e).
9. ☐ The affidavit or other evidence filed after the date of filing a Notice of Appeal, but prior to the date of filing a brief, will not be entered because the affidavit or other evidence failed to overcome all rejections under appeal and/or appellant fails to provide a showing a good and sufficient reasons why it is necessary and was not earlier presented. See 37 CFR 41.33(d)(1).
10. ☐ The affidavit or other evidence is entered. An explanation of the status of the claims after entry is below or attached.

REQUEST FOR RECONSIDERATION/OTHER

11. ☒ The request for reconsideration has been considered but does NOT place the application in condition for allowance because: See Continuation Sheet.
12. ☐ Note the attached Information Disclosure Statement(s). (PTO/SB/08 or PTO-1449) Paper No(s). ____
13. ☐ Other: _____.

TED T. Vo
Primary Examiner

Continuation of 11. does NOT place the application in condition for allowance because: Regarding Applicant's arguments on page 5 of his response (09/21/05), Applicant argues that in claim 1, contrary to his limitations, Callahan's target register definitions are not included in the blocks of code received...", but rather the definitions are inserted. Applicant's plain language of claim discloses "defining a set of target registers associated with each block", and hence in response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., "the target register definitions are included in the blocks of code received") are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims.

Furthermore regarding Applicant's argument that Callahan doesn't teach or suggest " a method of compiling a computer program from a sequence of computer instructions...", Examiner believes that Callahan does in fact teach this. Callahan in column 1:30 - 50, notably discloses a compiler which generates code to a "call" target register with the address of the function and also code to return the function with the target address which he has denoted as "callee save registers". Callahan further discusses his "callee save registers" in column 2:55 - 60, with regards to indentifying target addresses and branch instructions as recited in the preamble of claim 1. Hence Examiner maintains that this limitation is taught.

Regarding arguments to claims 6 - 8 and 9 - 11 as argued on page 6 - 8 of Applicants response, Applicant is simply rehashing arguments already addressed above in arguments of claim 1.

DETAILED ACTION

1. This action is in response to the application filed 12/28/04.

2. Claims 1 – 11 are pending.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 1-10 are rejected under 35 U.S.C. 102(e) as being anticipated by Callahan, II USPN 6,321,379 B1.

Regarding claim 1, Callahan anticipates a method of compiling a computer program from a sequence of computer instructions including a plurality of first, set branch, instructions which each identify a target address for a branch and a plurality of associated second, effect branch instructions which each implement a branch to a target address, the method comprising (2: 30 – 35):

reading said computer instructions in blocks (2: 33, discloses determining the location of target definitions for branch operations within the program, this would require the instruction to be read, inherently);

defining a set of target registers associated with each block for holding target addresses for the set branch instructions in that block (2:37 – 40);

defining as a live range of blocks a set of blocks for which a target address of a particular set branch instruction is in a live state (4: 12 – 17); and

using said set of target registers and said live range to ensure that target registers holding target addresses in a live state are not available for other uses (5: 16 – 19, see " no other family that uses that target register has a target definition located in the loop).

Regarding claim 2, a method according to claim 1, which comprises the steps of:

allocating each set branch instruction to an initial node in a dominator tree (FIG. 15, see 1501 and also dom list and refer to fig, 1 and 2 for tree like structure and 2: 44 for dominator block) , said initial node being the node which contains the corresponding effect branch instruction (FIG. 15, 1502); and

migrating one or more said branch instruction to an ancestor node in the dominator tree (Fig 3, 302, shows *(migrating)* branching to ancestor node).

Regarding claim 3, a method according to claim 2, wherein, during said step of migrating said at least one set branch instruction, the live range of blocks is incrementally updated (8: 65 – 67).

Regarding claim 4, a method according to claim 3, wherein, during said step of migrating said at least one set branch instruction, the set of target registers holding target

addresses in a live state is simultaneously incrementally updated (12:30 – 40).

Regarding claim 5, a method according to claim 1, wherein the union of said set of target registers and said live range is taken to define target registers holding target addresses in a live state(14: 10 –20, and lines 60 – 67).

Regarding claim 6, Callahan anticipates a method of operating a computer system to compile a computer program from a sequence of computer instructions including a plurality of first, set branch instructions which each identify a target address for a branch and a plurality of second, effect branch instructions which each implement a branch to the target address specified in the associated set branch instruction, the method comprising (2: 30 – 35):

executing a dominator tree constructor function in the computer system to read said computer instructions in blocks and to define a set of target registers associated with each block for holding target addresses for the set branch instructions in that block (4:15 – 25);

executing a lifetime tracking algorithm to define as a live range of blocks a set of blocks for which a target address of a particular set branch instruction is in a live state, said lifetime tracking algorithm being operable to use said set of target registers and said live range to ensure that target registers holding target addresses in a live state are not available for other uses (7:25 – 33, see dominator list and keeping track of live ranges).

Regarding claim 7, a method according to claim 5, which comprises the step of executing a migration function which migrates at least one set branch instruction to an ancestor node in the dominator tree (Fig 3, 302, shows *(migrating)* branching to ancestor node).

Regarding claim 8, a method according to claim 6, wherein said lifetime tracking algorithm is operable to define said live range of blocks on an incremental basis as the at

least one set branch instruction is migrated (7:25 – 33, see dominator list and keeping track of live ranges).

Regarding claim 9, which discloses the computer program version of claim 1, see rationale as previously discussed above.

Regarding claim 10, which discloses the computer program version of claim 2, see rationale as previously discussed above.

Regarding claim 11, a compiler according to claim 9, which comprises a determiner for determining the effect of migrating said set branch instruction to each of a set of ancestor nodes in the dominator tree based on a performance cost parameter (12:30 – 40).

Response to Arguments

5. Applicant's arguments filed 12/28/04 have been fully considered but they are not persuasive. Applicant argues on page 5 of response, that Callahan doesn't disclose "prevent the target register being available for other uses".

Examiner believes that Callahan does in fact disclose this limitation. As claimed Applicant merely discloses using the live ranges to ensure the prevention of the target register being available for other uses. Applicant doesn't mention how this is being performed and hence is being read as being disclosed by Callahan's teachings. Examiner believes this limitation is taught by Callahan. Callahan discloses using target definitions in the preheaders associated with the live ranges to prevent the register from being available for others and restricted to only the family which it encompasses (5: 16 – 25). Examiner understands this to be equivalent to "using said set of target registers and said live ranges to ensure that target registers holding target addressed in a live state are not available for other uses". Regarding all other arguments in claims 2 – 11, Applicant simply rehashes the arguments that has been discussed above.

Conclusion

6. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the

shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Chuck Kendall whose telephone number is 571-272-3698. The examiner can normally be reached on 10:00 am - 6:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tuan Dam can be reached on 571-272-3695. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

TUAN DAM
SUPERVISORY PATENT EXAMINER

Ck.